

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A passive stylus system for providing input to an electronic appliance, wherein the passive stylus utilizes a permanent magnet to provide passive stylus location information to a magnetic sensor system, said passive stylus system comprising:

a passive stylus including at least one permanent magnet;

14 a magnetic sensor system for ~~detecting~~ determining a location of the at least one permanent magnet disposed within the passive stylus ~~wherein the magnetic sensor system further comprises a plurality of magnetic sensors that are capable of (1) detecting the at least one permanent magnet, (2) determining a location of the at least one permanent magnet relative to a reference point, and (3) transmitting the location of the at least one permanent magnet;~~ relative to an area of operation, wherein the magnetic sensor system utilizes solid state magnetic sensor technology; and

~~a display system, wherein the display system utilizes the location of the at least one permanent magnet to display data on the display system that represents movement of the passive stylus within a field of operation.~~

an electronic appliance for receiving input from the magnetic sensor system regarding the location of the at least one permanent magnet within the area of operation, wherein the input is interpreted to be alphanumeric text, cursor control, or

graphical data.

2. (Canceled) The passive stylus system as defined in claim 1 wherein the magnetic sensor system further comprises at least two magnetic sensors that provide x and y coordinate information.

3. (Canceled) The passive stylus system as defined in claim 2 wherein the system further comprises utilizing a circular triangulation formula for determining a location of the passive stylus, wherein data from the at least two magnetic sensors is utilized in the circular triangulation formula to reduce inaccuracies in passive stylus position determination due to inclination or movement of the passive stylus.

4. (Canceled) The passive stylus system as defined in claim 3 wherein the passive stylus further comprises:

 a stylus body for housing components of the passive stylus;
 an ink cartridge;
 an actuator disposed on a non-inking end of the ink cartridge;

 at least one position magnet disposed adjacent to an inking end of the ink cartridge, having a hole through which the ink cartridge is disposed;

 a spring disposed around the ink cartridge, and between the at least one position magnet and a stylus tip;

a trigger magnet disposed above a non-inking end of the ink cartridge, and having a hole through which the actuator can pass;

a ferrous washer disposed above the trigger magnet, the ferrous washer having an outer shelf and an inner conical depression in a surface thereof;

a signaling magnet disposed at rest so as to be inclined, a bottom surface disposed at least partially at rest against the inner conical depression, wherein the ink cartridge will push the signaling magnet from an inclined position to an upright position so that the bottom surface of the signaling magnet is at least partially at rest against the outer shelf.

M 5. (Canceled) A method for providing input to an electronic appliance utilizing a stylus system that incorporates a permanent magnet, said method comprising the steps of:

(1) providing a stylus body having a permanent magnet associated therewith, and a magnetic sensor system;

(2) detecting the permanent magnet utilizing the magnetic sensor system;

(3) determining a location of the permanent magnet relative to a reference point; and

(4) transmitting the location of the permanent magnet in the stylus body.

6. (New) The passive stylus system as defined in claim 1

wherein the magnetic sensor system further comprises a plurality of magnetic field sensors that are capable of (1) detecting the at least one permanent magnet, (2) determining a location of the at least one permanent magnet relative to at least one reference point, and (3) transmitting the location of the at least one permanent magnet relative to the reference point to the electronic appliance.

7. (New) The passive stylus system as defined in claim 6 wherein the plurality of magnetic field sensors are further comprised of two pairs of magnetic field sensors, to thereby provide x axis and y axis coordinate information.

A1 8. (New) The passive stylus system as defined in claim 7 wherein the plurality of magnetic field sensors are further comprised of a third pair of magnetic field sensors that provide z axis coordinate information.

9. (New) The passive stylus system as defined in claim 7 wherein the plurality of magnetic field sensors are capable of determining if the passive stylus is oriented such that a stylus tip is being used within the area of operation, or an end opposite the stylus tip is being used within the area of operation, to thereby determine if the passive stylus is being used to generate input, or delete input.

10. (New) The passive stylus system as defined in claim 7 wherein the plurality of magnetic field sensors further comprises circuitry that enables subtraction of the magnetic field of the passive stylus from the earth's relative magnetic field to thereby obtain vector information that is used to triangulate a location of the at least one permanent magnet.

11. (New) The passive stylus system as defined in claim 10 wherein each of the plurality of magnetic field sensors further comprises:

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a polarizing coil for changing a direction of sensitivity;
a null coil for obtaining a zero magnetic field on the magnetic field sensor to thereby increase gain while maintaining linearity; and
a flipping coil.

12. (New) The passive stylus system as defined in claim 11 wherein the plurality of magnetic field sensors operate with a bandwidth of approximately 1 volt DC to approximately 1 MHz.

13. (New) The passive stylus system as defined in claim 12 wherein each of the plurality of magnetic field sensors further comprises a bridge circuit.

14. (New) The passive stylus system as defined in claim 7 wherein the passive stylus system further comprises a display device, wherein the display device shows the alphanumerical text, the cursor control, or the graphical data as input from the passive stylus system.

15. (New) The passive stylus system as defined in claim 7 wherein the electronic appliance is selected from the group of electronic appliances comprised of a mobile telephone, a personal digital assistant, a desktop computer, and a laptop computer.

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16. (New) The passive stylus system as defined in claim 7 wherein the passive stylus system further comprises data processing capabilities, wherein the passive stylus system determines the location of the passive stylus by utilizing a circular triangulation formula, wherein data from the plurality of magnetic field sensors is utilized in the circular triangulation formula to reduce inaccuracies in passive stylus position determination due to inclination or movement of the passive stylus that is not intended to generate input.

17. (New) The passive stylus system as defined in claim 7 wherein the passive stylus further comprises:
a stylus body for housing components of the passive stylus;
an ink cartridge;

a rapid movement system for rapidly moving the at least one permanent magnet within the stylus body when the ink cartridge moves into or out of the stylus body, movement of the ink cartridge into the stylus body being caused when the stylus tip of the passive stylus is pressed down onto a writing surface, and movement of the ink cartridge out of the stylus body being caused by lifting of the stylus tip off the writing surface; and

wherein the rapid movement system moves the at least one permanent magnet in a manner that is detectable by the plurality of magnetic field sensors and is indicative of input beginning or ending, and wherein the rapid movement is distinguishable from normal writing motions.

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18. (New) The passive stylus system as defined in claim 7

wherein the passive stylus further comprises:

- a stylus body for housing components of the passive stylus;
- a pencil cartridge;

a rapid movement system for rapidly moving the at least one permanent magnet within the stylus body when the pencil cartridge moves into or out of the stylus body, movement of the pencil cartridge into the stylus body being caused when the stylus tip of the passive stylus is pressed down onto a writing surface, and movement of the pencil cartridge out of the stylus body being caused by lifting of the stylus tip off the writing surface; and

wherein the rapid movement system moves the at least one

permanent magnet in a manner that is detectable by the plurality of magnetic field sensors and is indicative of input beginning or ending, and wherein the rapid movement is distinguishable from normal writing motions.

19. (New) The passive stylus system as defined in claim 17 wherein the passive stylus further comprises:

an actuator disposed on a non-inking end of the ink cartridge;

at least one position magnet disposed adjacent to an inking end of the ink cartridge, having a hole through which the ink cartridge is disposed;

A1 a spring disposed around the ink cartridge, and between the at least one position magnet and a stylus tip;

a trigger magnet disposed above a non-inking end of the ink cartridge, and having a hole through which the actuator can pass;

a ferrous washer disposed above the trigger magnet, the ferrous washer having an outer shelf and an inner conical depression in a surface thereof; and

a signaling magnet disposed at rest so as to be inclined, a bottom surface disposed at least partially at rest against the inner conical depression, wherein the ink cartridge will push the signaling magnet from an inclined position to an upright position so that the bottom surface of the signaling magnet is at least partially at rest against the outer shelf.

20. (New) A passive stylus system for providing input to an electronic appliance, wherein the passive stylus utilizes a permanent magnet to provide passive stylus location information to a magnetic sensor system, said passive stylus system comprising:

a passive stylus including at least one permanent magnet;

a plurality of magnetic field sensor pairs for determining a location of the at least one permanent magnet disposed within the passive stylus, relative to an area of operation;

an electronic appliance for receiving input from the magnetic sensor system regarding the location of the at least one permanent magnet within the area of operation, wherein the input is interpreted to be alphanumerical text, cursor control, or graphical data; and

a display screen for displaying information, including the input from the passive stylus.

21. (New) The passive stylus system as defined in claim 20 wherein the system further comprises an alphanumerical keyboard, said keyboard being disposed relative to the plurality of magnetic field sensors to thereby enable detection of a stylus tip of the passive stylus on the keyboard, to thereby enable input of alphanumerical data into the electronic appliance.

22. (New) A method for providing input to an electronic appliance utilizing a passive stylus system that incorporates a permanent magnet, said method comprising the steps of:

(1) providing a passive stylus having at least one permanent magnet disposed therein, and a magnetic sensor system associated with the electronic appliance;

(2) detecting a plurality of positions of the at least one permanent magnet by utilizing the magnetic sensor system;

(3) determining positions of the at least one permanent magnet relative to a reference point; and

M (4) transmitting the positions of the at least one permanent magnet in the passive stylus, wherein the positions are interpreted to be alphanumeric text, cursor control, or graphical data.

23. (New) The method as defined in claim 22 wherein the method further comprises the steps of:

(1) utilizing a first pair of the plurality of magnetic field sensors to determine a first vector;

(2) utilizing a second pair of the plurality of magnetic field sensors to determine a second vector; and

(3) generating x axis and y axis coordinate information for the positions of the at least one permanent magnet in the passive stylus.

24. (New) The method as defined in claim 23 wherein the method further comprises the steps of:

(1) utilizing a third pair of the plurality of magnetic field sensors to determine a third vector; and

(2) generating z axis coordinate information for the positions of the at least one permanent magnet in the passive stylus.

25. (New) The method as defined in claim 23 wherein the method further comprises the steps of:

(1) determining if the passive stylus is oriented such that a stylus tip is being operated within an area of operation;

A1 (2) determining if the passive stylus is oriented such that an end opposite the stylus tip is being operated within the area of operation; and

(3) generating input if the stylus tip is being operated within an area of operation and the passive stylus is actuated.

26. (New) The method as defined in claim 25 wherein the method further comprises the step of deleting input if the end opposite the stylus tip is being operated within the area of operation and the passive stylus is actuated to delete input.

27. (New) The method as defined in claim 26 wherein the method further comprises the steps of:

(1) subtracting the magnetic field of the passive stylus from the earth's relative magnetic field; and

(2) obtaining vector information that is used to triangulate the positions of the at least one permanent magnet.

28. (New) The method as defined in claim 27 wherein the method further comprises the steps of:

(1) polarizing a coil within each of the plurality of magnetic field sensors to thereby change a direction of sensitivity; and

(2) actuating a null coil within each of the plurality of magnetic field sensors to thereby obtain a zero magnetic field on the magnetic field sensor to thereby increase gain while maintaining linearity.

29. (New) The method as defined in claim 28 wherein the method further comprises the step of providing a display device associated with the electronic appliance, to thereby display the alphanumerical text, the cursor control, or the graphical data as input from the passive stylus system.

30. (New) The method as defined in claim 29 wherein the method further comprises the step of processing the vectors utilizing a circular triangulation equation, wherein data from the plurality of magnetic field sensors is utilized in the circular

triangulation equation to reduce inaccuracies in passive stylus position determination due to inclination or movement of the passive stylus that is not intended to generate input.

31. (New) The method as defined in claim 30 wherein the method further comprises the steps of:

(1) providing a stylus body for housing components of the passive stylus, an ink cartridge, and a rapid movement system;

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(2) rapidly moving the at least one permanent magnet within the stylus body when the ink cartridge moves into or out of the stylus body, wherein movement of the ink cartridge into the stylus body is caused when the stylus tip of the passive stylus is pressed down onto a writing surface, and wherein movement of the ink cartridge out of the stylus body is caused by lifting of the stylus tip off the writing surface;

(3) utilizing input from the plurality of magnetic field sensors when rapid movement of the at least one permanent magnet is detected when the stylus tip is pressed down onto a writing surface; and

(4) ceasing to utilize input from the plurality of magnetic field sensors when rapid movement of the at least one permanent magnet is detected when the stylus tip is removed from the writing surface.

32. (New) The method as defined in claim 30 wherein the method

further comprises the steps of:

(1) providing a stylus body for housing components of the passive stylus, an pencil cartridge, and a rapid movement system;

(2) rapidly moving the at least one permanent magnet within the stylus body when the pencil cartridge moves into or out of the stylus body, wherein movement of the pencil cartridge into the stylus body is caused when the stylus tip of the passive stylus is pressed down onto a writing surface, and wherein movement of the pencil cartridge out of the stylus body is caused by lifting of the stylus tip off the writing surface;

(3) utilizing input from the plurality of magnetic field sensors when rapid movement of the at least one permanent magnet is detected when the stylus tip is pressed down onto a writing surface; and

AM (4) ceasing to utilize input from the plurality of magnetic field sensors when rapid movement of the at least one permanent magnet is detected when the stylus tip is removed from the writing surface.

33. (New) The method as defined in claim 31 wherein the method further comprises the step of providing an actuator disposed on a non-inking end of the ink cartridge, at least one position magnet disposed adjacent to an inking end of the ink cartridge having a hole through which the ink cartridge is disposed, a spring disposed around the ink cartridge and between the at least one

position magnet and a stylus tip, a trigger magnet disposed above a non-inking end of the ink cartridge and having a hole through which the actuator can pass, a ferrous washer disposed above the trigger magnet wherein the ferrous washer has an outer shelf and an inner conical depression in a surface thereof, and a signaling magnet disposed at rest so as to be inclined, a bottom surface disposed at least partially at rest against the inner conical depression, wherein the ink cartridge will push the signaling magnet from an inclined position to an upright position so that the bottom surface of the signaling magnet is at least partially at rest against the outer shelf.

M 34. (New) A method for providing input to an electronic appliance utilizing a passive stylus system that incorporates a permanent magnet, said method comprising the steps of:

(1) providing a passive stylus including at least one permanent magnet, a plurality of magnetic field sensor pairs for determining a location of the at least one permanent magnet disposed within the passive stylus, relative to an area of operation, an electronic appliance for receiving input from the magnetic sensor system regarding the location of the at least one permanent magnet within the area of operation, wherein the input is interpreted to be alphanumerical text, cursor control, or graphical data, and a display screen for displaying information, including the input from the passive stylus;

(2) detecting a plurality of positions of the at least one permanent magnet by utilizing the plurality of magnetic field sensors;

(3) determining positions of the at least one permanent magnet relative to a reference point; and

(4) transmitting the positions of the at least one permanent magnet in the passive stylus, wherein the positions are interpreted to be alphanumerical text, cursor control, or graphical data.

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35. (New) The method as defined in claim 34 wherein the method further comprises the step of providing an alphanumerical keyboard, said keyboard being disposed relative to the plurality of magnetic field sensors to thereby enable detection of a stylus tip of the passive stylus on the keyboard, to thereby enable input of alphanumerical data into the electronic appliance.
